



Cafe CAT-R QuickStart Guide

This guide describes the setup procedure for the Cafe Tool for disc Reader (CAT-R) environment. CAT-R is a Cafe development system that has an optical disc drive. It is similar to the Wii U retail system and should be used for final application testing.



NOTE

The instructions in this document pertain to CAT-R units only. For instructions on using CAT-DEV units, see the *Cafe SDK CAT-DEV QuickStart Guide*.

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Cafe CAT-R QuickStart Guide

The CAT-R development system is a Cafe development system equipped with an optical disc drive. It does not have a debug output as in a CAT-DEV. Connections with the DRC-DK MP and the Wii Remote can be either wired or wireless. The CAT-R is the Wii U development hardware that is used for final debugging. Because it uses a CPU exclusively for development tools, it cannot be used with retail versions of applications.

NOTE

There is no CAT-R with the same 8 GB of NAND memory as the Wii U Basic Set.

The CAT-R has 2 GB of main memory, which is the same as the Wii U Console. The CAT-R has 32 GB of NAND memory, which is the same as the Wii U Deluxe Set. The CAT-R cannot boot into Wii U Compatibility Mode. It also does not support the CEC feature of HDMI.

This guide describes the setup procedure for the CAT-R environment.



With this environment, developers may:

- Create and run CAT-R discs.
- Install and run applications using a SD card.
- Monitor audio and video output.
- Monitor debug and log output.
- Use peripherals, such as mass storage media, game controllers, and network interfaces.

CAT-R Limitations

The following limitations should be acknowledged when running applications on a CAT-R.

- The amount of usable memory for applications on a CAT-R is 1GB. A CAT-R's main memory size is the same as a WUP production unit's main memory size. Therefore, the size of usable memory for an application is 1GB less than the 2GB usable memory that is available on a CAT-DEV. Setting a CAT-DEV's *Memory Size for Application*, to **Production** from the *System Config Tool*, provides the same amount of usable memory, 1GB.

- There is no host PC when using a CAT-R and therefore, no host I/O access. Attempts at accessing files on a host PC using HostFile I/O causes the system to become unresponsive. Accessing a location other than the paths specified by the following environment variables causes unresponsiveness.

- CAFE_CONTENT_DIR
- CAFE_SAVE_DIR

As a result, the file system fails to mount and a function does not return successfully.

- The following are supported only on a CAT-DEV. They may fail when used with a CAT-R.
 - Classic Controller for Debug
 - CPU Profiler
 - USB-MIDI
 - GPU Profiler
- Timing is different between a development CAT-DEV and a production oriented CAT-R. Issues observed on a CAT-R may not occur on a CAT-DEV. For example, data load times increase when applications are run directly from a disc when compared to running applications from a CAT-DEV.

Common Terms

Term	Definition
API	An Application Programming Interface (API) is a protocol that software components use to communicate with each other. An API may include specifications for functions, data structures, object classes, and variables.
SDK	The Software Development Kit contains a set of application programming interfaces (APIs) and other software development tools that are used to develop, build, run, debug, and master applications for the Wii U.
CAT-DEV	The Cafe Tool for Development (CAT-DEV) hardware system. The host PC provides file system emulation for the CAT-DEV application. This means that the application and its associated files may be generated and maintained on the PC. The host bridge hardware in the CAT-DEV transparently routes all file I/O requests to the PC. Therefore, burning an optical disc or installing content on the CAT-DEV internal storage is not necessary.
CAT-R	Cafe Tool for disc Reader (CAT-R) is a Cafe development system that has an optical disc drive. It is similar to the Wii U retail system and should be used for final application testing.
CAT-R Writer	The CAT-R Writer is a disc drive that connects to the host PC with a SATA cable. You must have a CAT-R Writer to create firmware update discs for CAT-R units.
Wii U GamePad	The Wii U GamePad (GamePad) is a controller for the Cafe system that has a built-in touch-panel LCD screen. The GamePad outputs video and audio

Term	Definition
	processed by the Wii U, and inputs control information from the touch screen and buttons, audio from the onboard microphone, and video from the onboard camera to the Wii U. It is also referred to as the Display Remote Control (DRC).
DRC-DK	The standard DRC unit for Wii U development. Similar to a retail Wii U gamepad, the unit can be paired with any Wii U devkit.
DRC-DK MP	Connects to a CAT-DEV or CAT-R wirelessly or by using a cable. The DRC-DK MP has a jack for making a wired connection.
DRC-DK-TV	Functionally equivalent to the standard DRC-DK but with two exceptions. The DRC-DK-TV can only operate in wired mode, and has HDMI and audio output ports to facilitate video/audio capture from the DRC.
System Config Tool	Software utility that runs on a CAT-DEV or CAT-R, and helps users set up system configurations, manage titles, and save data necessary for game development. The System Config Tool replaces an older utility known as DevMenu.
HOME Menu	The HOME Menu (HBM) is a system application that is activated when the user presses the HOME Button on the controller. This application provides a uniform interface for exiting an application; launching the Internet browser, e-manual reader, or other overlay applications; or adjusting various system preferences. The HBM is a system software component not linked to a game.
NAND boot mode	NAND boot mode (NAND mode) is a CAT-DEV mode of operation that is determined by the bootloader. In NAND mode, the majority of the files referenced by the system, on boot and as it runs applications, come from the CAT-DEV's internal, NAND-based, file system. Boot firmware, the OS, System Config Tool, and other system applications are installed on the internal NAND storage. NAND boot mode more closely resembles the final retail system and enables you to use the CAT-DEV without a host PC. It is useful for large-scale program testing and validation before burning the program to optical disc.
PCFS boot mode	PCFS boot mode (PCFS mode) is a CAT-DEV mode of operation that is determined by the bootloader. In PCFS mode, only the low-level boot firmware is stored on the internal NAND storage. The operating system, System Config Tool, system applications, and developer programs reside on the host PC. PCFS boot mode, regardless of the transport choice, is not compatible with headless, or standalone mode, because PCFS requires file system service from the host PC, connected via Ethernet.

For more information on Common Terms, see the *Cafe Glossary* in the online MAN pages.

Prerequisites

CAT-R Development Environment

The Cafe CAT-R Development Environment consists of:

Cafe SDK Environment

- The base Cafe Software Development Kit (SDK).
- The Cafe SDK Docs Patch (documentation is now unbundled from the base SDK).
- The Cafe SDK Demo Patch (demo patch is now unbundled from the base SDK).

Hardware Environment

- The Cafe CAT-R Reader. The CAT-R Reader tool, CAT-R Reader + DRC-DK (or DRC-DK-TV), includes in the box:
 - CAT-R Reader
 - DRC-DK (or DRC-DK-TV)
 - Wii Remote Plus (wireless)
 - HDMI cable
 - Stereo AV cable
 - USB to RS-232 cable
- The Cafe CAT-R Writer.
- The Cafe CAT-R Discs.
- A host PC.
- A television or monitor (optional).
- Wii U Remote (optional).

NOTE

The host PC, and television or monitor are not included with the kit hardware. These must be provided by the user.

Software Environment

- The Cafe tool for disc reader (CAT-R).
- Updates that you download from the Wii U page of your local Nintendo developer support group website.

CAT-R Host PC Requirements

Host PC Minimum Requirements

The minimum computer requirements for the host PC are as following:

- 2 GHz Core 2 Duo-class CPU or better.
- 2 GB or more of RAM; 4GB or more if using the mastering tool.
- 40 GB or more of free hard-disk space that is formatted using NTFS.
- Microsoft Windows 7 Professional with Service Pack 1 (x64).
- Microsoft .NET Framework 4.
- Microsoft Visual C++ 2010 SP1 Redistributable Package (x64).
- Administrator account to install and use the Cafe SDK and associated tools.
- SATA interface that is used to connect the CAT-R writer

Supported CAT-R Models

The SDK provides support for the CAT-R. For more information about supported features and known issues, see the release notes included in the SDK release package.

NOTE If you are using a CAT-DEV, see the *Cafe SDK CAT-DEV QuickStart Guide* for instructions.

Supported Displays

Any HDTV television or monitor with the following is supported:

- Up to 1080p resolution.
- HDMI, component, S-video, or composite video inputs.

Install and Set Up the CAT-R System

To help ensure that the CAT-R system setup is successful, perform the installation and setup steps in the order that they are listed. The steps to set up the Cafe SDK and the CAT-R system are:

1. [Install the base SDK on the host PC.](#)
2. [Install the Docs Patch for the documentation.](#)
3. [Install the Demo Patch for the demo programs.](#)
4. [Set up the CAT-R Writer.](#)
5. [Set up the CAT-R and update the firmware.](#)
6. [Set up the DRC and update its firmware.](#)

Detailed steps are provided in this section.

Step 1: Install the Base SDK on the Host PC

The base Cafe SDK package contains:

- Prebuilt firmware, operating system, drivers, and libraries.
- A script and makefile based build system.

To install the SDK, unzip the SDK package to a safe location on the host PC.

Ensure that there are no spaces anywhere in the file path name for the SDK. Also, avoid using a lengthy file path to the SDK installation.

Examples of path names that are acceptable.

- C:\cafe_sdk
- C:\cafe_sdk_21003
- C:\Users\jdoe\Desktop\CAFE_SDK

Examples of path names that are not acceptable.

- C:\cafe sdk
- C:\Users\John Doe\Desktop\CAFE_SDK
- C:\User Dir\jdoe\Desktop\CAFE_SDK

CAUTION

Do NOT unzip the package over an existing SDK installation. Full SDK releases are meant to stand alone.

Step 2: Install the SDK Docs Patch

The Cafe SDK Docs Patch contains the documentation for the Cafe SDK.

To install the Docs Patch

1. Open the Docs Patch ZIP file.
2. Right-click the `cafe_sdk` folder in the Docs Patch ZIP file, and then click **Copy**.
3. Right-click anywhere in the folder where you unzipped the SDK package, and then click **Paste**.
4. In the *Confirm Folder Replace* dialog box, click **Yes** to confirm that you want to merge the existing `cafe_sdk` folder with the `cafe_sdk` folder that you copied from the Docs package.

Step 3: Install the SDK Demo Patch

The Cafe SDK Demo Patch contains the source code and associated files for the demo programs that are referenced throughout this manual.

To install the Demo Patch

1. Open the Demo Patch ZIP file.
2. Right-click the `cafe_sdk` folder in the Demo Patch ZIP file, and then click **Copy**.
3. Right-click anywhere in the folder where you unzipped the SDK package, and then click **Paste**.
4. In the *Confirm Folder Replace* dialog box, click **Yes** to confirm that you want to merge the existing `cafe_sdk` folder with the `cafe_sdk` folder that you copied from the Demo package.

Step 4: Set Up the CAT-R Writer

The CAT-R Writer is a disc drive that connects to the host PC with a SATA cable. You must have a CAT-R Writer to create firmware update discs for CAT-R units. Multiple writers may be used at the same time. However, since a single update disc may be used on multiple CAT-R units, only one writer is absolutely required.



CAT-R Writer

NOTE

After you attach the CAT-R Writer to the host PC, it appears in Device Manager, but it does not appear as an accessible drive under *Computer* in *Windows Explorer*. You must use the *Wii U R-Disc Writing Tool* to access the CAT-R Writer.

Step 5: Set Up the CAT-R and Update the Firmware

In the following steps, you will set up your CAT-R, and then update the CAT-R firmware.

To Set Up the CAT-R

1. Using the power cable, plug the CAT-R in to an electrical outlet.



CAT-R System

2. Connect the CAT-R to a television using the HDMI or other video cable.
3. To turn the CAT-R on, press the **POWER** Button on the front of the device.
4. After the CAT-R finishes the startup process, the *System Config Tool* is displayed on the television screen.

CAT-R System Update

NOTE

You must use CAT-R discs that have Wii U and Nintendo trademarks.

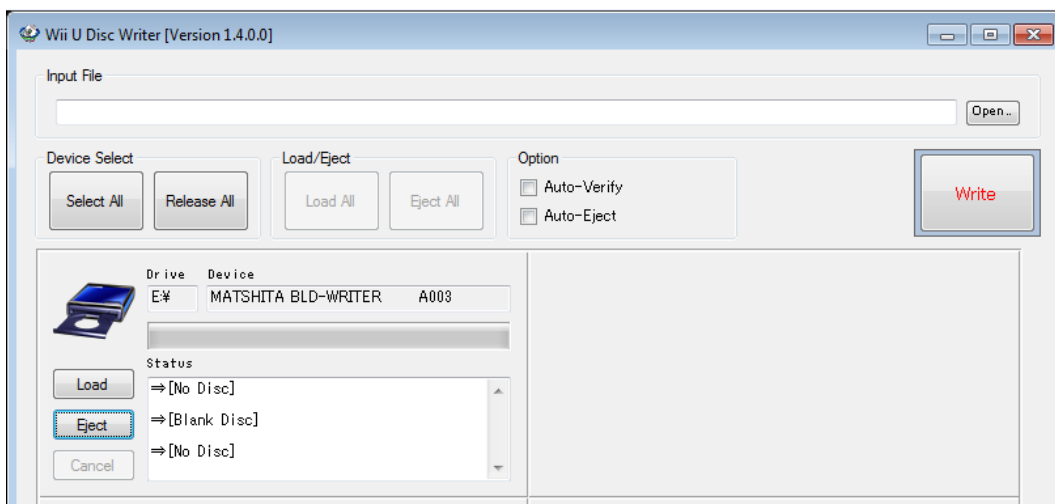


CAT-R Discs

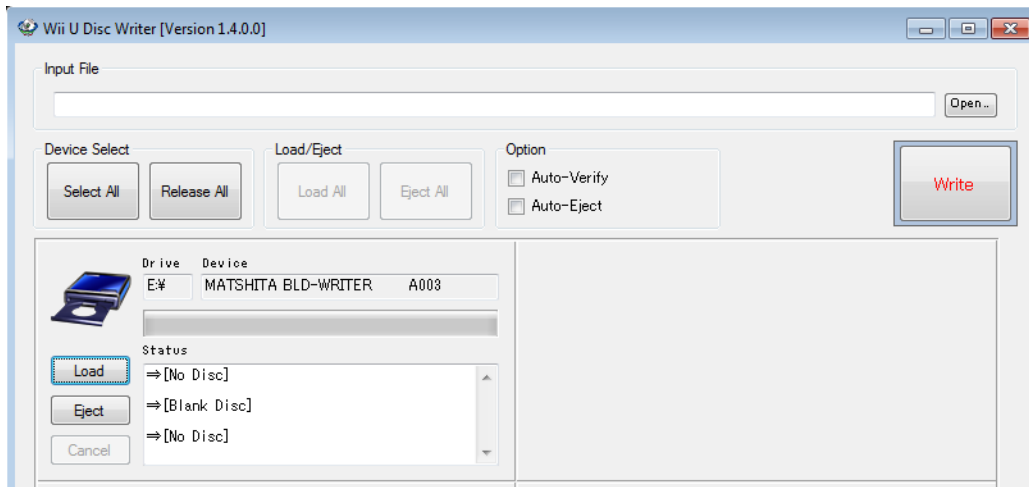
Perform the following steps for all updates in the sequence that is listed in the Development Hardware Update Sequence table in the Important: System Update Sequence for Development Hardware announcement on the Wii U page of your local Nintendo developer support group website.

To update the CAT-R firmware

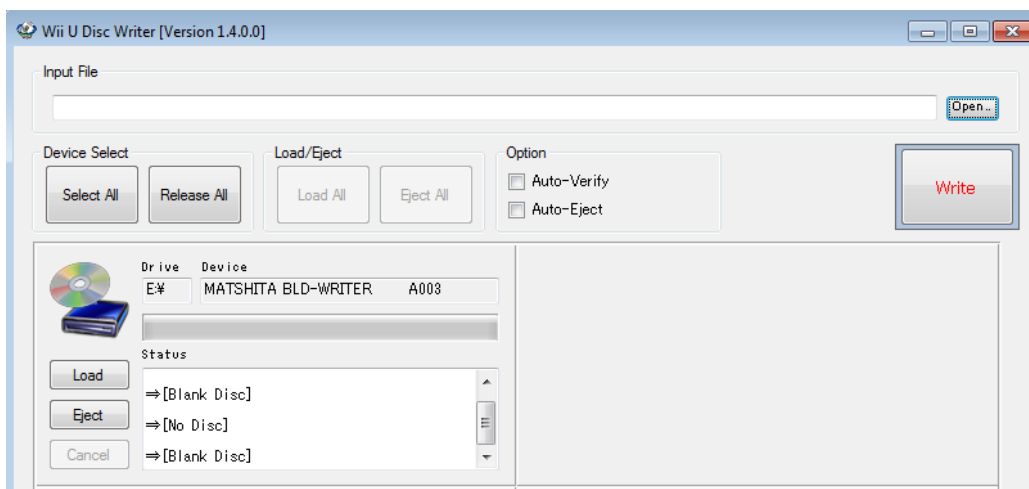
1. Log on to the Wii U Home page of your local Nintendo developer support group website.
2. Download the following packages:
 - a. *Wii U R-Disc Writing Tool*
 - b. *CAT-R Updater: SDK 2.07.03 to SDK 2.08.11*
 - c. *CAT-R Updater: SDK 2.04.02 to SDK 2.07.02*
3. Extract the *Wii U R-Disc Writing Tool* package to an empty directory on the host PC.
4. Navigate to the location where you extracted the *Wii U R-Disc Writing Tool* package, and then double-click `wuwriter.exe` in the `WiiU-DiscWritingTool-YYYYMMDD/bin` directory.
5. To open the tray on the CAT-R Writer, click **Eject**.



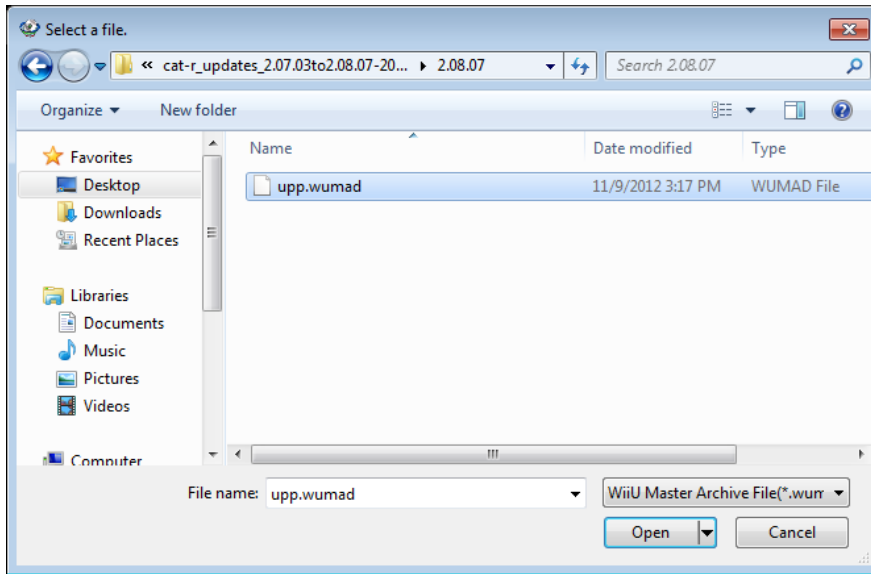
- Insert a blank CAT-R disc in the tray, and then click **Load** to close the tray.



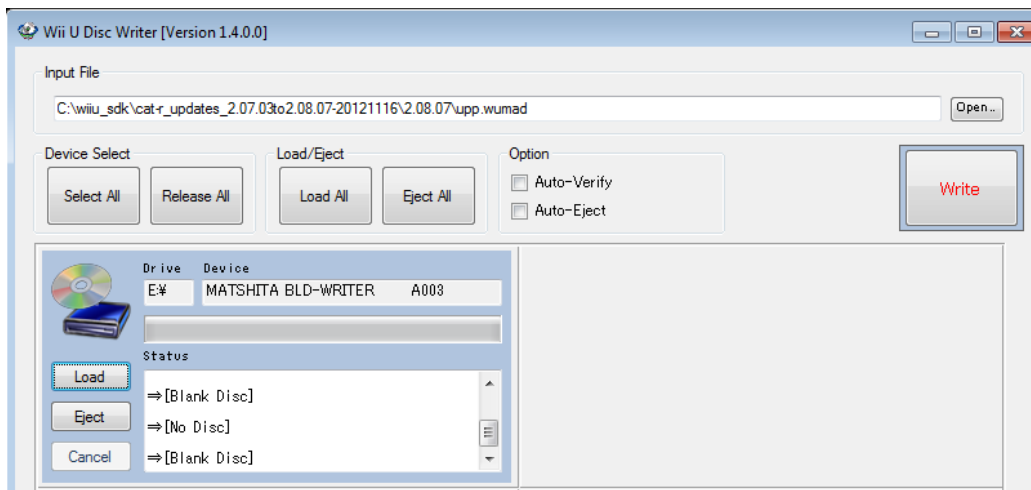
- Click **Open**.



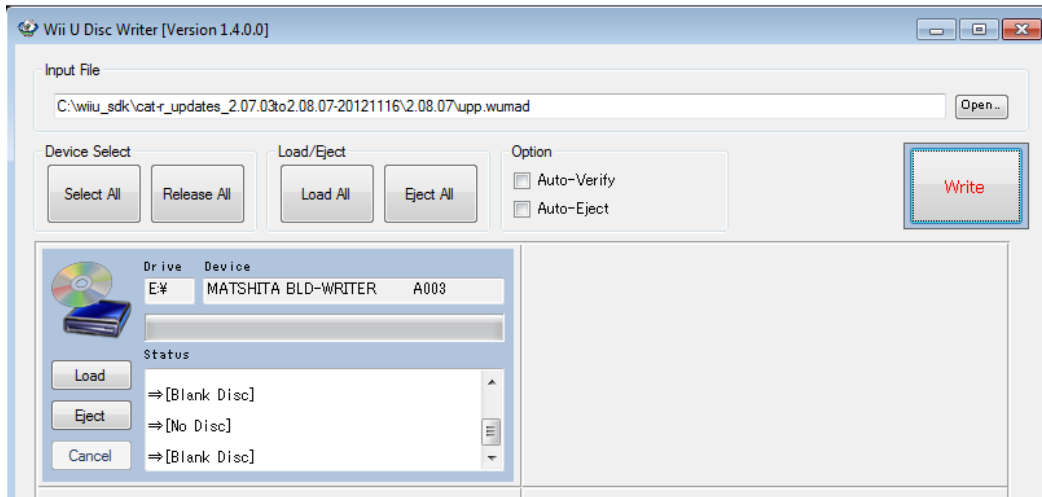
- In the updater package that corresponds to the SDK version that you want to use, select `<version>.wumad`, and then click **Open**.



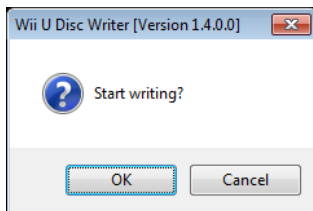
9. To select the CAT-R Writer, click the icon in the box that corresponds to the drive that you want to use. The box turns blue to indicate that it is selected.



10. Click **Write**.



11. Click **OK** in the dialog box, and then wait for the writing process to complete.



12. Click **Eject**, remove the disc from the writer, and then click **Load** to close the tray.
13. If not already turned on, turn the CAT-R on, and then insert the R-Disc.
14. On the *System Config Tool, Root Menu*, click *Boot Configuration*. For information about *System Config Tool*, see **Cafe SDK Basics** → **System Configuration Tool** → *Boot Configuration* in the MAN pages.
15. On the *Boot Configuration* menu, verify that *System Mode* is set to **Development Mode** and that *Memory Size for Application* is set to **2GB (Development)**. This helps ensure a successful system update.
16. On the *System Config Tool, Root Menu*, click **Update System**.
17. Similar to disc applications, update packages have the odd0x identifier. SDKs are annotated by their major, minor and micro versions. For example, the SDK 2.09.02 option is displayed as `"/vol/storage_odd0x/update/020902"`. On the *Update System* menu, select the title named **sdkxxx** to update.
18. At the bottom of the *Update System* menu, the confirmation message *Are you sure? (Press A to confirm)* is displayed. Press **A**.
19. The message *DO NOT POWER OFF! Preparing system update* is displayed.
20. After system preparation finishes, the CAT-R restarts, and the **Frame** and **Percent** counters are displayed during the update. Ensure that you DO NOT TURN THE POWER OFF the CAT-R during this process.
21. The CAT-R restarts automatically when the process is complete.

22. When the *System Config Tool* is displayed again, confirm the System Config Tool version at the top of the screen, and then eject the disc from the CAT-R.

If you have any questions or require additional assistance, contact your local Nintendo software developer support group.

Step 6: Set Up the GamePad (DRC) for the CAT-R

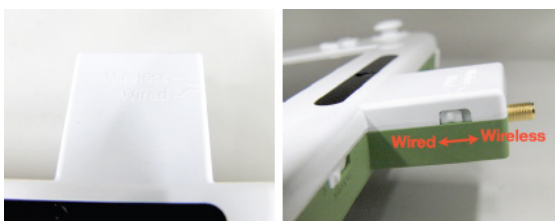
In the following three sets of instructions, you will set up the Display Remote Control (DRC), pair the DRC, and then update the DRC firmware.

Set Up the DRC

1. Connect the AC adaptor to the DRC, and then plug it in to an electrical outlet.



2. Connect the coaxial cable from the DRC to the DRC1 coax port on the CAT-R.
3. On the top of the CAT-R, set the switch labeled *DRC* to *Wired*.
4. Set the switch on the side of DRC coaxial connection to the position closer to the DRC body. The position closest to the DRC body is labeled *Wired*, and the other position is labeled *Wireless*.



5. Connect the Classic Controller Pro to the *Classic CON* port on the CAT-R.

Pair the DRC

1. Turn the CAT-R on. After a short wait, the *System Config Tool* is displayed on the television screen.
2. To sync the Wii U Remote to the CAT-R, press the **SYNC** Button on the CAT-R and on the controller.
3. Using the Wii U Remote, select the *DRC Setting* option, and then press the **A** Button.
4. Select the *Pair DRC* option, and then press the **A** Button.



5. To turn the DRC on, press the **POWER** Button on the unit.
6. Use the stylus to press the **SYNC** Button on the back of the DRC.



7. A PIN is displayed on the television screen. Enter the PIN on the DRC. When the *Root Menu* is displayed again on the television, the pairing is complete.

Update the DRC Firmware

1. Using the Wii U Remote, select the *DRC Setting* option, and then press the **A** Button.
2. If the *Update WOWL* option:
 - a. IS available, select it using the Wii U Remote, and then press the **A** Button. The update will start. It may take a several minutes for the update to complete, and the DRC may power off at the end of the update.
 - b. IS NOT available, go to the next step.
3. Select the *Update DRC Firmware* option, and then press the **A** Button on the Classic Controller Pro. The update will start. It may take several minutes for the update to complete, and the DRC may power off at the end of the update.
4. The DRC is now updated and may need to be paired again. If you need to pair the DRC again, repeat the [Pair the DRC](#) steps.

Update DRC Firmware for SDK 2.10.03

For SDK 2.10.03, CAT-DEV MP and DRC-DK MP / DRC-DK-TV use firmware version 23.8. The firmware configurations for DRH and DRC firmware are shown in the table below. The micro versions are now omitted in the *System Config Tool*.

Configuration	DRH version	DRC version
Factory shipping	11.0.4506	11.2.4736
SDK 2.03	11.3.4910	
SDK 2.04	16.1	
SDK 2.05	17.0	
SDK 2.06.00	19.1	
SDK 2.06.01	19.3	
SDK 2.06.03	20.7	20.6
SDK 2.08.07	21.16	
SDK 2.09.03	21.20	
SDK 2.09.04	21.24	
SDK 2.09.06	21.26	
SDK 2.09.09	21.30	
SDK 2.10.02	23.6	
SDK 2.10.03	23.8	

Update CAT-R Firmware

The CAT-R development system cannot be updated using the CAT-DEV methods. An SD Card or a special optical R-disc is used to update the CAT-R firmware.

To update the CAT-R console system, follow the procedures described in the following sections.

- Sequential Update
- Verify a CAT-R System Update is Required
- Update CAT-R Firmware Using R-Disc
- Firmware Update via Recovery using SD Card

CAUTION

After updating to SDK version 2.07.01 or later, do NOT downgrade to SDK 2.06.02 or older versions.

A down arrow (↓) in a column means that you may skip updating to that version, and update directly to the next version listed in the column.

Sequential Update

The CAT-R firmware should be updated sequentially as indicated below.

SDK Ver.	CAT-R
2.04.02	<i>Factory Installed</i>
2.05.00	2.05.00
2.06.00	↓
2.06.01	2.06.01
2.06.02	2.06.02
2.07.01	2.07.01
2.07.01 P1	
2.07.02	↓
2.07.03	2.07.03
2.07.03 P1	2.07.03 P1
2.07.03 P2	↓
2.07.03 P3	↓

SDK Ver.	CAT-R
2.07.03 P4	↓
2.07.03 P5	↓
2.08.01	↓
2.08.02	↓
2.08.03	↓
2.08.04	↓
2.08.05	↓
2.08.06	↓
2.08.07	↓
2.08.08	↓
2.08.09	↓
2.08.10	↓
2.08.11	2.08.11

Verify a CAT-R System Update is Required

This section describes the methods to verify if a CAT-R console system update is required by obtaining the current Cafe OS SDK version and build numbers.

Verification Procedure

If the CAT-R console system version number and the version number being updated are the same, a CAT-R console system update is unnecessary.

The verification procedure for the CAT-R console system version differs according to the application that starts running when the power to the CAT-R console is turned on. Verify by using one of the following methods.

Verify Using the System Config Tool

1. Power on the CAT-R console.
2. From the *System Config Tool*, on the *Root Menu*, select **Software Version Information**.
 - The first line on the screen shows *Cafe OS SDK Version <version> Build XXXXX*. The *<version>* indicates the CAT-R console system version.

Verify Using the DevMenu

1. Power on the CAT-R console.
 - The first line on the screen of *DevMenu* shows *DEVMENU Version <version> OS minor version 0xXXXX*. The *<version>* indicates the CAT-R console system version.

Verify Using the Wii U Menu

1. Power on the CAT-R console.
2. On the Wii U Menu, select **Switch to System Config Tool**.
3. From the *System Config Tool*, on the *Root Menu*, select **Software Version Information**.
 - The first line on the screen shows *Cafe OS SDK Version <version> Build XXXXX*. The *<version>* indicates the CAT-R console system version.

When the CAT-R System Version is Earlier than 2.07.03P5

Follow the procedure in the *Update CAT-R Firmware Using R-Disc* section below, and update to firmware 2.07.03P5 in the following order.

1. 2.04.02
2. 2.06.01
3. 2.06.02
4. 2.07.01P1
5. 2.07.03
6. 2.07.03P1
7. 2.07.03P5

When Wii U Menu Launches When the CAT-R Power is turned On

Uninstall the *Wii U Menu* with the *Wii U MenuChanger* by referring to the *Uninstalling* section of the *Wii U MenuChanger User's Manual* included with the *Wii U MenuChanger* package. Then perform a CAT-R system update.

Update CAT-R Firmware Using R-Disc

The following components are required when you create an R-disc to update a CAT-R.

- Optical R-Disc burner installed on your PC
- Wii U Disc Writing Software (WiiU-DiscWritingTool-xxxxxxx.zip)
- Wii U Optical R-Disc. Use CAT-R discs that have Wii U and Nintendo trademarks.
- CAT-R Development System
- A PC with at least 70 GB of hard drive free space.
- Master Archive Update Image (.wum or .wumad file). You may find the update image file in the Cafe SDK:

%CAFE_ROOT%\<version>.wumad

IMPORTANT

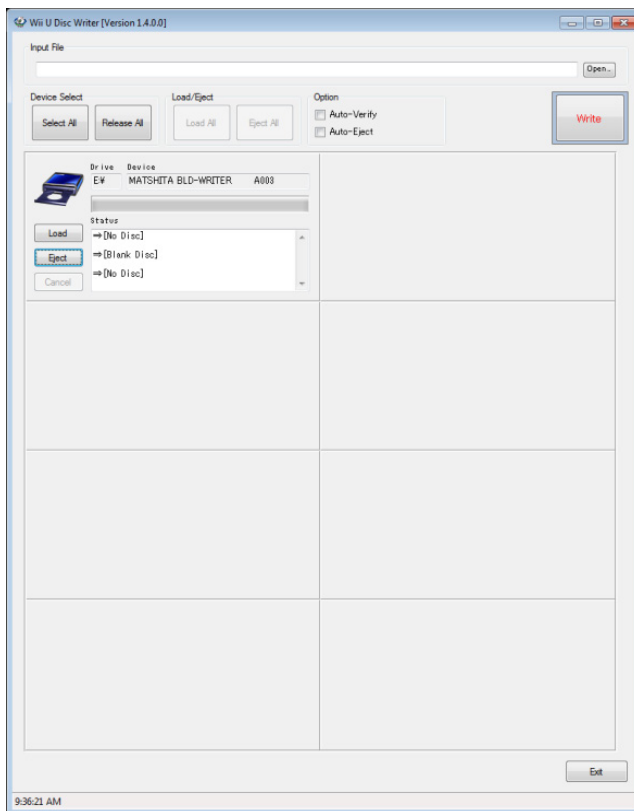
The Optical R-Disc Burner and Cafe Optical R-Discs are not included with the standard Cafe Development Kit. For availability and ordering information, contact your local Nintendo developer support group.

The R-Disc burning process takes approximately 25 minutes for a 25GB image. If a .wumad file is used, the software automatically pads the image to 25GB before beginning the burn process, which increases the processing time.

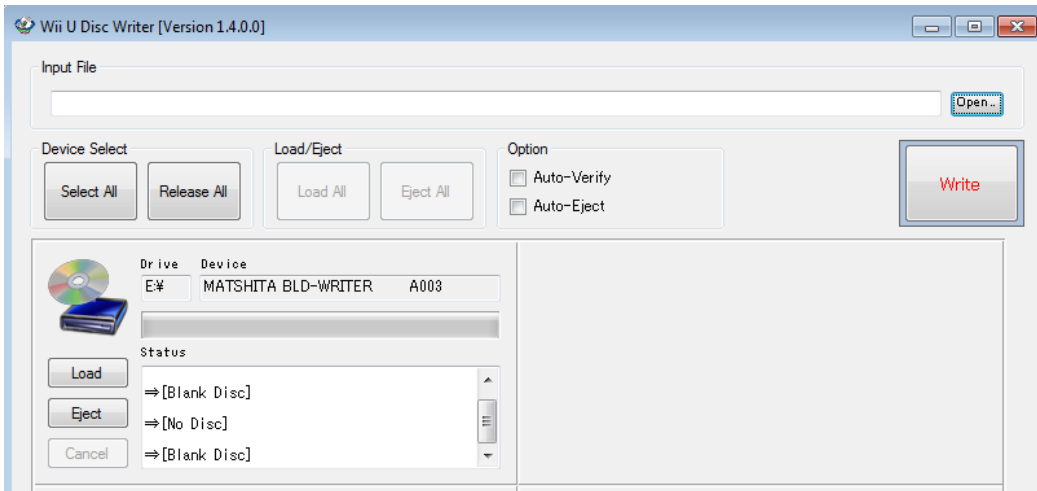
If an R-disc for updating the CAT-R console system has already been prepared, skip this creation procedure and proceed to the section on applying the update.

To Create a Firmware Update R-Disc

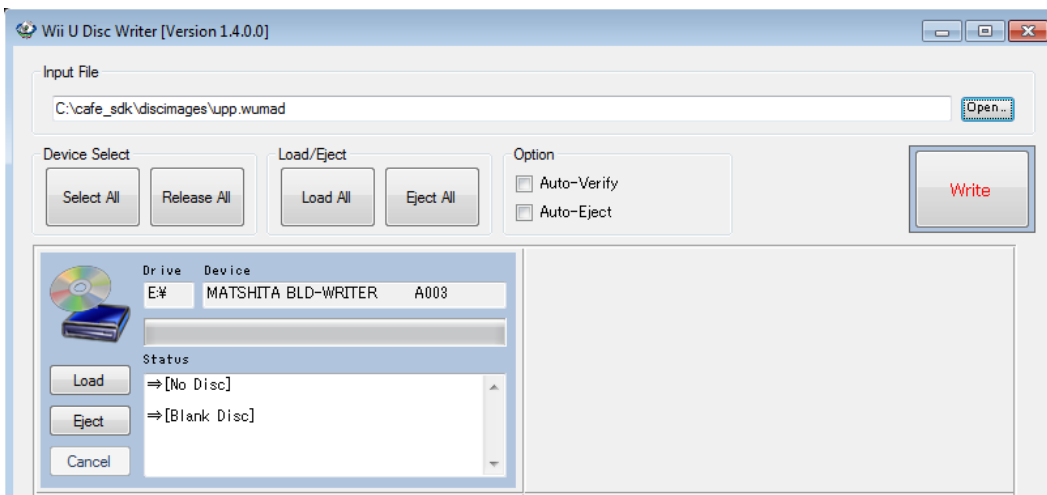
1. Save the *Master Archive Update Image* to a local drive on the host PC. For example:
C:\cafe_sdk\discimages
2. Navigate to the *WiiU Disc Writer* folder, and then double-click **wuwriter.exe**.
3. Click **Eject** to open the tray on the optical R-disc burner.



4. Insert a blank CAT-R disc in the tray, and then click **Load** to close the disc tray. When the optical drive is ready, the following is displayed:



5. To load the *Master Archive Update Image*, click **Open..**, and then navigate to the location where you saved the file in Step 1.
6. To select an optical write system, click the disc with a blue drive image. If you have more than one optical burner, and want to write to all of them, click **Select All**.



7. To start the burn process, click **Write**. A confirmation message is displayed before the burn process begins.

To Update CAT-R Firmware Using the System Config Tool

1. Turn the CAT-R ON, and then insert the R-Disc.
2. Launch the *System Config Tool*.
3. On the *System Config Tool Root Menu*, click **Boot Configuration**.
4. On the *Boot Configuration* menu, verify that *System Mode* is set to **Development Mode** and that *Memory Size for Application* is set to **2GB (Development)**. This helps assure a successful system update.

5. On the *System Config Tool Root Menu*, click **Update System**.
6. Similar to disc applications, update packages have the `odd0x` identifier. SDKs are annotated by their major, minor and micro versions. For example, the SDK 2.09.02 option is displayed as `"/vol/storage_odd0x/update/020902"`. On the *Update System* menu, select the title named **sdkxxx** to update.
7. At the bottom of the *Update System* menu, the confirmation message *Are you sure (Press A to confirm)* is displayed. Press **A**.
8. The message *DO NOT POWER OFF! Preparing system update* is displayed.
9. After system preparation finishes, the CAT-R restarts, and the *Frame* and *Percent* counters are displayed during the update. Ensure that you **DO NOT TURN THE POWER OFF** the CAT-R during this process.
10. The CAT-R restarts automatically when the process is complete.
11. When the *System Config Tool* is displayed again, confirm the **CAT-R console system version** at the top of the screen, and then eject the disc from the CAT-R.
12. Power off the CAT-R, by pressing the **POWER** Button, and then disconnect the power cable from the CAT-R and reconnect it. This allows the DRH to perform a necessary hard reset.
13. Turn the CAT-R ON, and then start the DRC firmware update process.

NOTE

In some rare cases, the DRC cannot connect to the CAT-R because the CAT-R did not turn ON correctly in the final step. If this occurs, unplug the CAT-R power cable from the system, and then reconnect it before continuing.

To Update CAT-R Firmware Using DevMenu

1. Turn the CAT-R ON and launch *DevMenu*.
2. On the *Root Menu*, select **System Information**.
3. Rest the pointer on *System Mode*, click the **A** Button, select *Development*, and then press the **B** Button. Following the same procedure, set *Limit System Memory for Production* to *Disabled*.
4. Insert the prepared R-disc for updating the CAT-R console system.
5. On the *Root Menu*, select **Update**.
6. Select `<version> System on odd02` and press the **A** Button.
7. When the message *Are you sure? (Press A to confirm)* is displayed on the bottom of the screen. Press the **A** Button. Do not turn off power to the CAT-R during the update. The display on the screen changes to *Frame = xxxxx*, *Percent = xx%* during update. When the has completed, the CAT-R automatically restarts.

8. When the *System Config Tool* is displayed, verify the *CAT-R console system version* and remove the R-disc from the CAT-R console.
9. Turn off power to the CAT-R console.

Firmware Update via Recovery using SD Card

Required Tools and Equipment

- SD Card.
- Update image: <version>.ddi file.
- DD for Windows 0.9.9.6.
 - Download *DD for Windows 0.9.9.6.zip* (http://download.silinux.co.jp/dd_for_windows/DDWin_Ver0996.zip) and extract the folder on your Windows PC.

CAUTION

All data on the SD Card will be lost and/or overwritten.

If an SD Card for updating the CAT-R console system has been prepared, skip this initialization procedure and proceed to the section on applying the update.

To Initialize the SD Card

1. Insert a SD Card into the appropriate slot on the host PC.
2. Open the folder where you unzipped *DD for Windows 0.9.9.6*, right-click on **DDWin.exe**, and then click **Run as Administrator**.
3. Click **Choose Disk**, and select the drive letter for the SD Card device.
4. Click **Choose File**, and select <version>.ddi.
5. Click **Restore** and follow the prompts.
6. When writing completes, safely eject the SD Card from the host PC.

To Update the Firmware on the CAT-R

1. Power off the CAT-R, by holding down the **POWER** Button for 4 seconds.
2. Insert the SD Card for updating the CAT-R into the CAT-R console.
3. Simultaneously press and hold the **EJECT** Button and **POWER** Button on the CAT-R console and then release them when the **Power** LED turns orange.
 - Installation for the update proceeds. For the **Power** LED illumination state, see the table below.

- Do not turn off power to the CAT-R console during installation. Wait until the LED sequence shows success or failure. If power is turned off, the CAT-R console will be damaged and require repair.

Description	LED Sequence
Installation in Progress	Blue → Red → Orange
Installation Successful	Blue → Orange
Installation Failed; The error code is represented by the number of Yellow → Red or Blue → Red pulses.	Orange → Red → Blue → Red → Red → Red

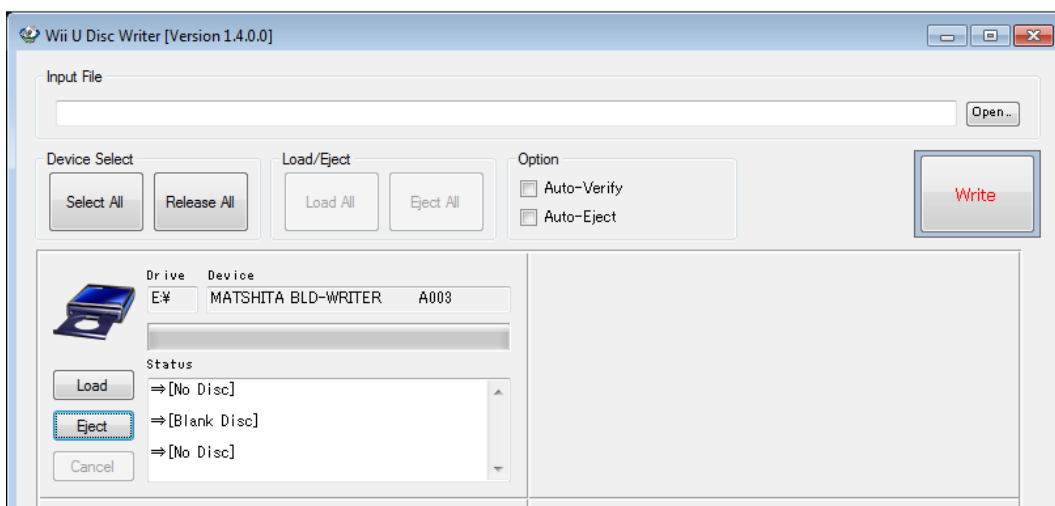
4. After installation completes, press the **POWER** Button to shut down the CAT-R. Press the **POWER** Button again to restart the CAT-R. The update is complete.

Use Your CAT-R

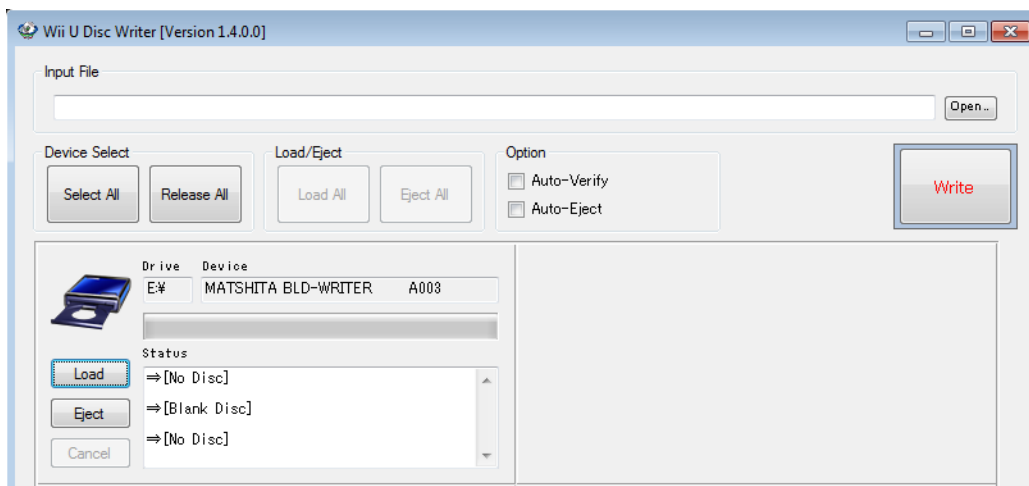
Create a CAT-R Disc

To create a disc from a mastered wumad or wum image

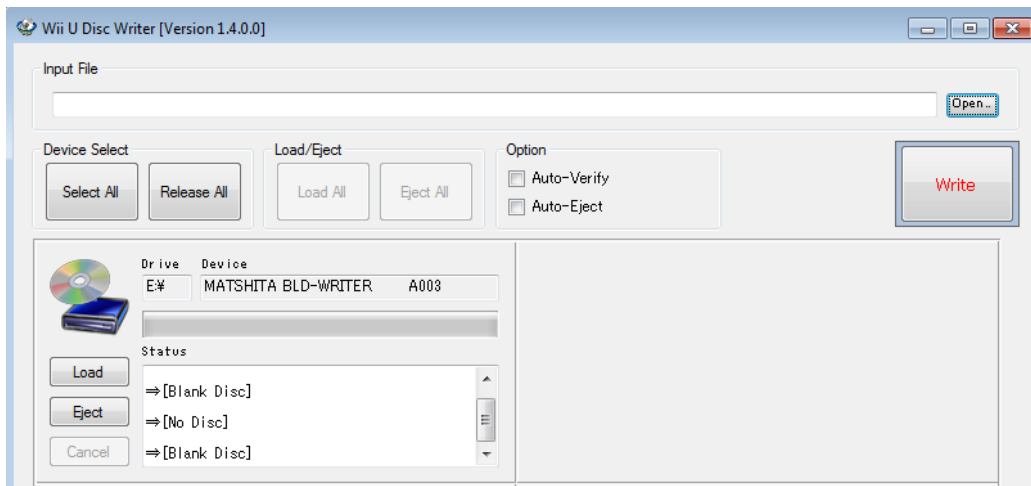
1. Navigate to the location where you extracted the *Wii U R-Disc Writing Tool* package, and then double-click `wuwriter.exe` in the `WiiU-DiscWritingTool-YYYYMMDD/bin` directory.
2. To open the tray on the CAT-R Writer, click **Eject**.



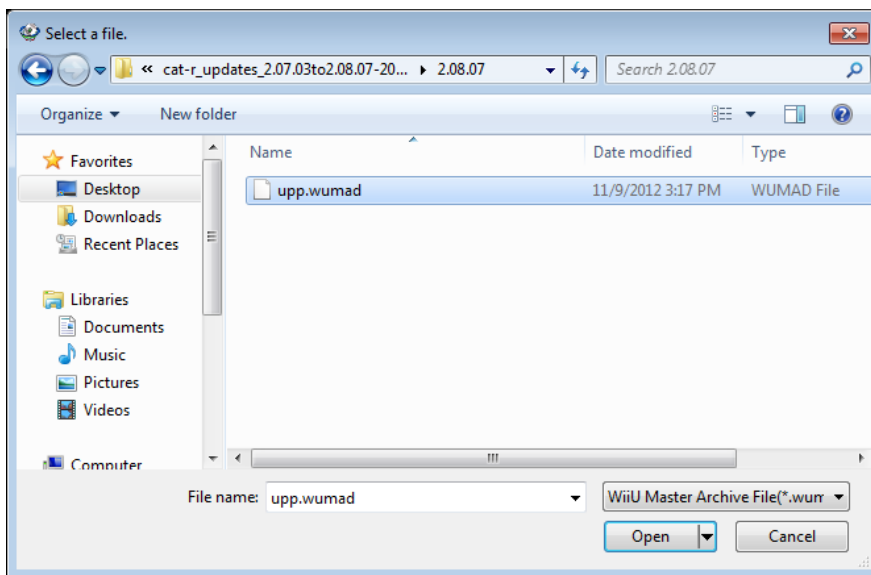
3. Insert a blank CAT-R disc in the tray, and then click **Load** to close the tray.



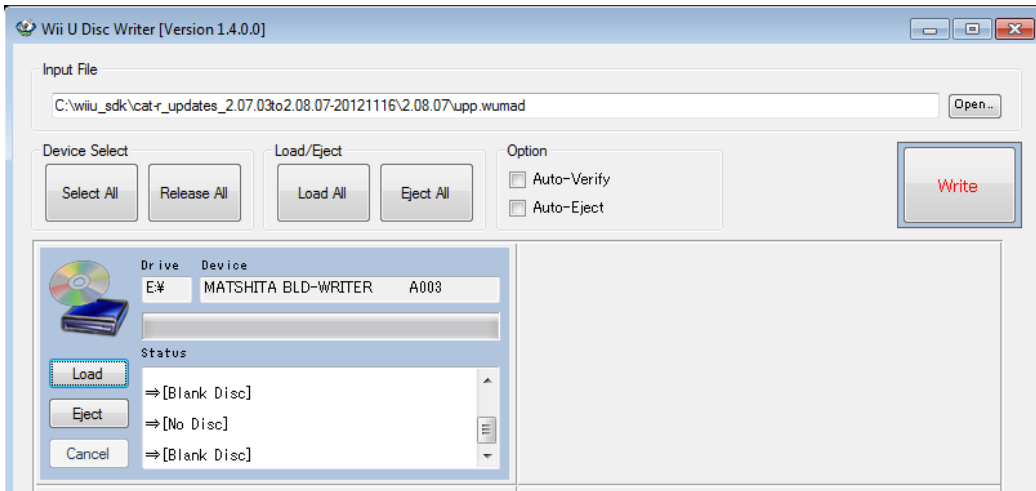
4. Click **Open**.



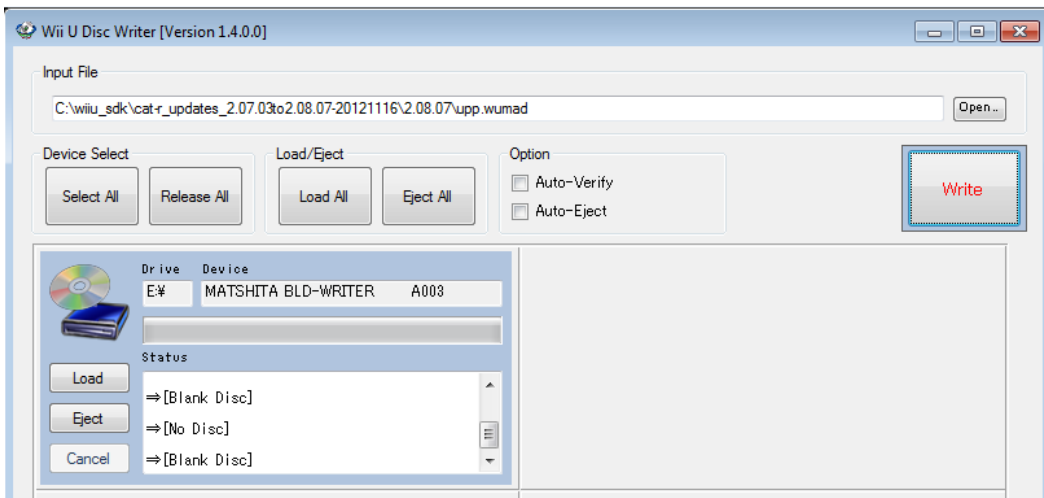
5. Select the wumad or wum image that you want to use, and then click **Open**.



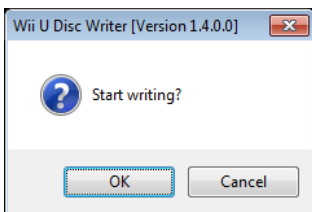
6. To select the CAT-R Writer, click the icon in the box that corresponds to the drive that you want to use. The box turns blue to indicate that it is selected.



7. Click **Write**.



8. Click **OK** in the dialog box, and then wait for the writing process to complete.



9. Click **Eject**, remove the disc from the writer, and then click **Load** to close the tray.

For instructions to create master images, see *Master Applications* in the *Cafe SDK CAT-DEV QuickStart Guide*.

NOTE

The process of mastering an image requires a full development environment as described in the *Cafe CAT-DEV QuickStart Guide*.

Launch an Application from a CAT-R Disc

To create an R-Disc for an application, see [Update CAT-R Firmware](#) and **Cafe SDK Basics** → **Development Cycle** → *Master Applications* in the MAN pages.

1. Turn on the CAT-R, and then wait for the *System Config Tool* to display on the television screen.
2. Insert the CAT-R disc with the mastered image into the CAT-R Reader.
3. Using the Wii U Remote, navigate to, and then select *Title Launcher*.
4. The *Title Launcher* menu displays a list of all of the applications that are installed. Disc applications have an "odd0x" identifier. Select the application that you want to run, and then press the **A** Button twice.

Serial Logging on the Wii U

You may review the logs leading up to a system hang or crash by viewing the system log in the *System Log Viewer* menu in the *System Configuration Tool*. The system has a circular log buffer of approximately 64KB that may still be available. However, there is a hardware issue that causes the log to be erased if you do not restart the system very quickly.

You may also obtain the log output via the serial logging interface on a CAT-R or a CAT-DEV that is in headless mode. With the serial logging interface, logs are output as they are printed from the application by using functions such as `OSReport`. When the USB-to-Serial adapter is connected the first time after a hang occurs, the system sends out any logs stored in the buffer.

This section discusses the serial logging process and provides information about the physical adapters and cables that are needed to perform serial logging on the Wii U.

For information about saving the system log (or syslog), see **Cafe SDK Basics** → **Development Cycle** → **Debug Applications** → *Saving System Logs to an SD Card* in the MAN pages.

Hardware

To connect the CAT-DEV to the host PC for serial logging, a USB-to-Serial adapter and a crossover cable are required. If the host PC does not have a serial port, an additional USB-to-Serial adapter is needed for the host PC.

USB-to-Serial Adapter

The Wii U does not have a serial port. There is also a high probability that the host PC does not have a serial port. Because of the simplicity of the RS232 standard, the Wii U uses a serial interface to dump logs. Not just any USB-to-Serial adapter works for this process.

Serial Adapter Chipsets

USB-to-Serial adapters are not simple cable rearrangements. They require a chip to convert from the serial interface (RS232) to the USB interface. There are two common chipsets in use to do this conversion. The first is the PL2303 family of chips made by Prolific. The second common chipset is the FT232 family of chips made by FTDI. These two companies do not make USB-to-Serial adapters; they manufacture the chips that are packaged in to many different retail adapters. When purchasing an adapter, it is very important to confirm which chipset that the adapter is based on.

Serial Adapter for the Wii U

The Wii U requires a USB-to-Serial adapter that uses the FTDI FT232B or FT232R chipset. Since the Wii U has drivers only for these chipsets and no other drivers may be installed, this is a hard requirement. For details on purchasing an FTDI serial adapter, contact the supplier of your choice.

The Gearmo PRO Single Port USB-to-Serial Adapter with Activity LED is recommended for a CAT-DEV. For purchasing details, contact the supplier of your choice.

The adapters shown in the table below have been tested and verified to work with CAT-DEV and CAT-R. There is no plan to support other adapters.

Table 1: USB-to-Serial Adapters

Make	Model	Chip Set
US232B/LC		
VSCOM	USB to RS-232 Cable	FTDI FT232B
QVS	USB to RS-232 Cable	FTDI FT232B

There is no plan to support other adapters.

CAUTION

If you are emulating a final production runtime environment, do not connect a USB-to-Serial adapter to the CAT-R. When the adapter is connected to the console display output, there is a small amount of system overhead added when the system loads, such as CPU utilization and MEM2 traffic.

NOTE

If OSReport output should exceed the rate that the debugging interface can handle, then messages may be dropped. This rare behavior is by design, ensuring that system performance is not adversely affected by blocking until the printing operation catches up. If this happens, the following message is printed:

```
***** log buffer overrun, some text was dropped *****
```


Serial Adapter for the Host PC

Because any driver may be installed on a PC, virtually any available USB-to-Serial adapter with any chipset should work on the host PC. USB-to-Serial adapters may be found for as little as a few dollars. However, some of the very inexpensive USB-to-Serial adapters claim to have the Prolific PL2303 chipset when they actually substitute a chipset that is distributed by another manufacturer. To work properly, these devices require an older version of the Prolific driver (3.2.0.0). Even with the older driver, they may not provide the desired performance. For example, some characters may be garbled. The older version of the driver is not plug-and-play via Windows Update and may be harder to find. When ordering a less expensive USB-to-Serial device with the Prolific chipset, ensure that a driver disc is included. After installing the driver, you may need to update the device driver version to 3.2.0.0 in the Windows Device Manager.

Cross-Over Cable

If you are using a USB-to-Serial adapter on the devkit and the host PC, you need a cross-over cable, also called a NULL Modem, to connect the two adapters. Cross-over cables swap the send and receive pins on one end of the serial connection, enabling the data that is sent from the devkit to be received by the host PC. It is very important that you do not simply purchase a serial extension cable, which does not swap these pins. A cross-over cable may be purchased inexpensively from many online retailers.

Software

Terminal emulation software is required on the host PC that is configured as follows:

Table 2: Terminal Software Configuration

Speed	57600 bps
Data	8-bit
Parity	none
Stop	1-bit
Flow Control	none
Terminal New-line	CR+LF

A small, stand-alone program is provided that automatically configures the terminal emulation software as specified, logs all output, and saves the output to a file on request. You may find the program in the `$CAFE_ROOT/system/tool/CatLog` directory.

Troubleshooting Serial Logging

Receive limited or no log output

When limited or no log output is received from a devkit, the most likely cause is a connection problem. Confirm that all connectors are properly connected and working. After checking the connections, verify that the *System Mode* is set to **Development Mode**. The *System Mode* may be configured in the *Boot Configuration* menu of the *System Config Tool*.

Troubleshoot CAT-DEV Issues

- [The CAT-R Does Not Power On](#)
- [Video Does Not Appear on the TV](#)
- [The DRC-DK Screen is Distorted \(Jumpy\) or Sound is Intermittent](#)
- [Cannot Communicate with the Wii Remote](#)
- [The Power LED Blinks](#)
- [Cannot Read the Disc](#)
- [A Message Appears on the DRC-DK Screen Indicating that it Cannot Connect to the Console](#)
- [The DRC-DK or CAT-R Fails to Start](#)

The CAT-R Does Not Power On

- Check whether the CAT-R and the Wii U AC adapter are connected correctly.
- Check whether the Wii U console adapter is connected to the power outlet.

Video Does Not Appear on the TV

- Check whether the CAT-R and the HDMI cable or Wii AV cable are connected correctly.
- Check whether the resolution of the display is correct (up to 1080p) and that it supports either a HDMI or a component input.
- Check whether the display is set to use the correct input.
- Try changing the cable connecting the CAT-R to the display. If connecting by using the HDMI cable, try switching to the Wii AV cable or the other way around. If video appears on the display after changing the cable, use the following steps to change the video output settings.

Changing the Settings from the Wii U Menu

1. Prepare a DRC-DK that has been paired with the CAT-R you want to use.
2. Start the Wii U Menu, and then use the DRC-DK to make the appropriate changes to the TV connection settings in the *System Settings* menu.

Changing the Settings from the System Configuration Tool

1. Prepare a Wii Remote that has been paired with the CAT-R you want to use.
2. Use the Wii Remote to select the **Display and Audio** option from the menu that appears immediately after the tool starts.

3. Set the connection setting to either **AUTO** or **MANUAL**, and then make the appropriate changes to the display settings.

The DRC-DK Screen is Distorted (Jumpy) or Sound is Intermittent

- When making wireless connections to the DRC-DK MP.
 - Check whether the DRC switch on the CAT-R is set to **Wireless**.
 - Check whether the wired/wireless switch on the DRC-DK MP and the settings in the DK menu are set for wireless connections.
 - Other wireless devices near the CAT-R that use the 5-GHz band for communication can sometimes affect the wireless connection between the CAT-R and the DRC-DK MP.
- When making wired connections with the DRC-DK MP or DRC-DK-TV.
 - Check whether the DRC switch on the CAT-R is set to **Wired**.
 - Check whether the wired/wireless switch on the DRC-DK MP and the settings in the DK menu are set for wired connections.
 - Check that the coaxial cable is properly connected.
 - The coaxial cable could be broken. Check whether replacing the coaxial cable fixes the problem.
- When using multiple units of development hardware at the same time.
 - The devices can interfere with each other. Check whether reducing the number of devices in use simultaneously fixes the problem.

Cannot Communicate with the Wii Remote

- Check whether the CAT-R and the Wii Remote are paired correctly.
- When making wireless connections with the Wii Remote.
 - Check whether the BT switch on the CAT-R is set to Wireless.
- When making wired connections with a wired Wii Remote.
 - Check whether the BT switch on the CAT-R is set to Wired.
 - Check that the coaxial cable is properly connected.

The Power LED Blinks

- The Power LED sometimes blinks periodically when something abnormal occurs with the CAT-R. For more information, see the *Cafe SDK API Reference Manual*.

Cannot Read the Disc

- Check whether the disc inserted is a CAT-R disc.
- Check whether the CAT-R disc has been inserted upside down.
- Check whether the surface of the CAT-R disc is scratched or needs cleaning.
 - Check whether a different disc can be read.

A Message Appears on the DRC-DK Screen Indicating that it Cannot Connect to the Console

If a connectivity screen appears on the DRC-DK as shown below, check the following.



- Check whether the CAT-R and the DRC-DK are paired correctly.
- When making wireless connections to the DRC-DK MP.
 - Check whether the DRC switch on the CAT-R is set to **Wireless**.
 - Check whether the wired/wireless switch on the DRC-DK MP and the settings in the DK menu are set for wireless connections.
 - Other wireless devices near the CAT-R that use the 5-GHz band for communication can sometimes affect the wireless connection between the CAT-R and the DRC-DK MP.
- When making wired connections with the DRC-DK MP or DRC-DK-TV.
 - Check whether the DRC switch on the CAT-R is set to **Wired**.
 - Check whether the wired/wireless switch on the DRC-DK MP and the settings in the DK menu are set for wired connections.
 - Check that the coaxial cable is properly connected.

- The coaxial cable could be broken. Check whether replacing the coaxial cable fixes the problem.

NOTE

A screen appears on the DRC-DK screen for approximately one minute after the CAT-R is powered off, but this is expected.

The DRC-DK or CAT-R Fails to Start

When the DRC-DK or CAT-R starts, in rare cases the following symptoms may occur.

- When running an application on the console or when turning on the console, sometimes the paired DRC-DK does not power on.
- Sometimes the console does not power on when the paired DRC-DK is powered on.
- Sometimes the paired DRC-DK cannot connect to the console even when it is turned on.

If one of these symptoms occurs, repeat the action that was taken before it occurred.

If the symptom continues to occur, use the following steps to update the WOWL firmware.

1. Start the system configuration tool, and then select **Wii U GamePad (DRC) Settings**.
 - Select the **WOWL Firmware Update** option.
2. The update takes approximately 30 seconds.
3. After the WOWL firmware update is completed, this option no longer appears.

NOTE

If the power is turned off while the WOWL firmware update is in progress, repairs will be required. Do not turn off the power until the update has completed.

Revision History

Revision Date	Description
2014/09/12	Added Troubleshoot section.
2014/09/12	Added CAT-R Limitations section.
2014/02/24	Updated Min. Reqs.
2014/02/19	Updated firmware table.
2013/12/12	Update for new SDK patches.
2013/10/25	Updated for SDK 2.10.03.
2013/09/15	Updated to include all bug changes since last publication.
2013/06/15	Converted to PDF format
2013/05/10	Added common terms and CAT-R picture
2013/05/08	Automated cleanup pass
2013/03/20	Restore post-hang serial logging instructions.
2013/03/01	Merge QSGs into SDK Basics -> Systems.
2012/08/08	Initial version

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